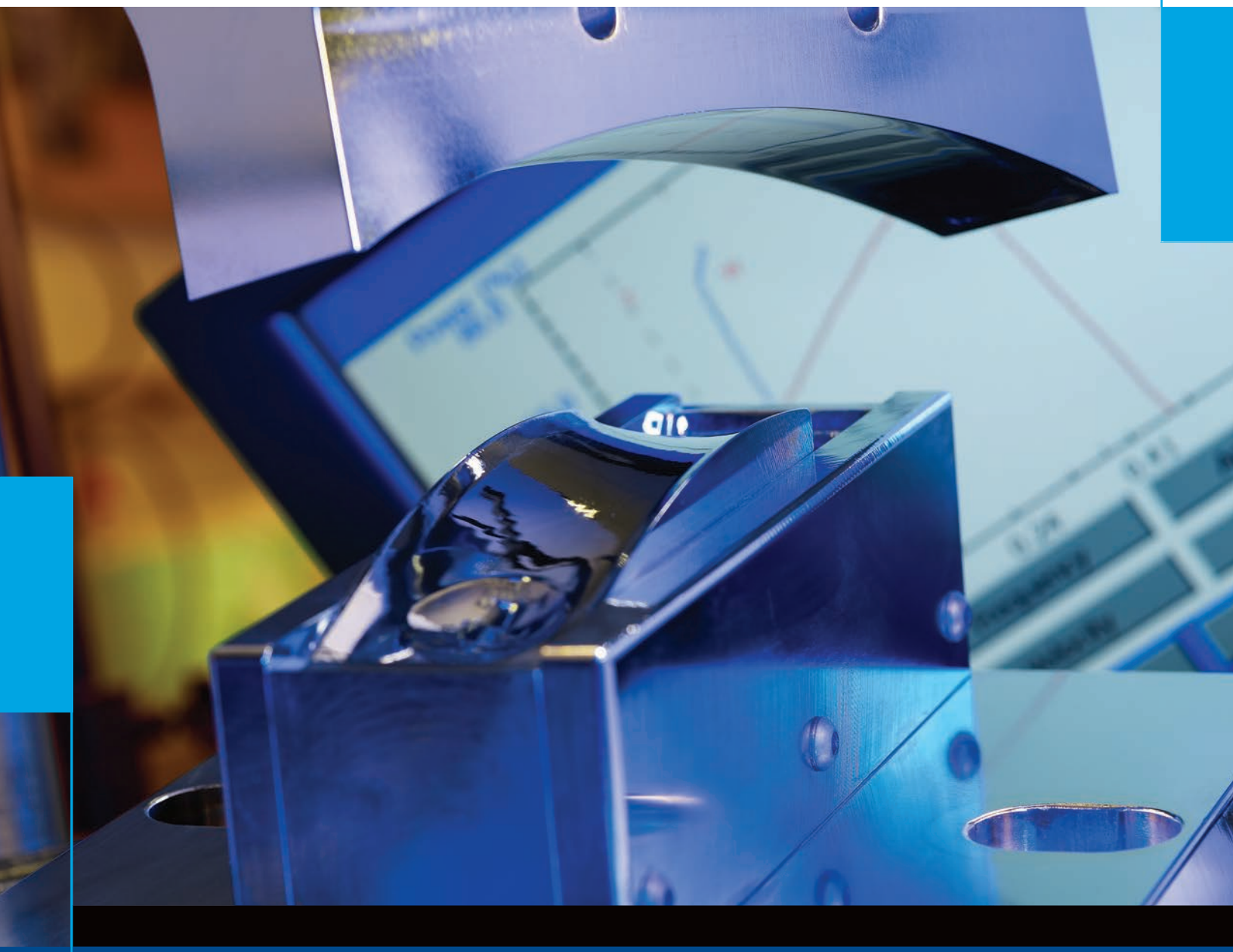
2000X Series

BRANSON



Ultrasonic Plastic Welding Assembly Systems

Digital, Customizable, Plastics Welding Technology

EMERSON
Industrial Automation

Branson 2000X Series Leads the Way in Digital, Adaptable, Precision-Control Plastic Welding Technology.

Branson 2000X Series ultrasonic assembly systems offer you a range of system models with varying process control levels and functionalities to match your application needs. Whether you choose our most fully featured 2000X d, the advanced functionality of the 2000X ea, or the basic features of our 2000X t, you are assured of robust reliable performance and precision control.

In addition, the 2000X system's power supply offers multiple weld mode control levels (time, energy, peak power, distance, and ground detect), three output ultrasonic frequencies (20, 30 or 40 kHz), and the flexibility to combine with one of several actuator options to create an ultrasonic assembly system that reflects the precise level of performance, control, and value your application needs.

The Branson 2000X Series can be adapted to automation systems or as a stand-alone complete system in an assembly cell.

2000X Series Assembly System

Branson 2000X Standard Features

Power Supply and Process Control

- **True Digital Autotune with Memory (AT/M) –** Provides fully-automatic tuning and stores horn frequency at the end of each weld.
- **Total Amplitude Control –** Utilizing Branson's digital power supply technology, you have complete control of amplitude throughout the weld cycle: programmable starting ramp, digital setting of weld amplitude, and energy braking.
- **Programmable Starting Ramp –** Adjustable starting ramps from 10 milliseconds to 1.0 second to accommodate starting characteristics of a wide range of horns. This feature makes it easier to start more difficult horns. When utilizing smaller horns, you can minimize the starting ramp reducing cycle times.
- **Auto Seek –** Automatically measures stack frequency and stores it in memory. Five selectable Auto Seek choices are available.
- **Energy Braking –** A controlled stopping of the ultrasonic stack. This feature eliminates the traditional "ring down" of the stack creating a more consistent energy input into the parts. Small horns can actually be stopped faster, increasing throughput in high-speed automation.

- **Self-diagnostics and Monitoring –** Visual, audible, and logic output alarms.
- **Multiple Weld Modes –** Depending on the control level selected, weld by time, peak power, energy, or distance (absolute or collapse).
- **Line / Load Regulation –** Corrects for variations due to power line fluctuations and varying load conditions through Branson's closed-loop amplitude control. Output amplitude is maintained with a variation of only ±2% with line voltage variations of ±10%, regardless of load, improving weld consistency (Fig. 1).

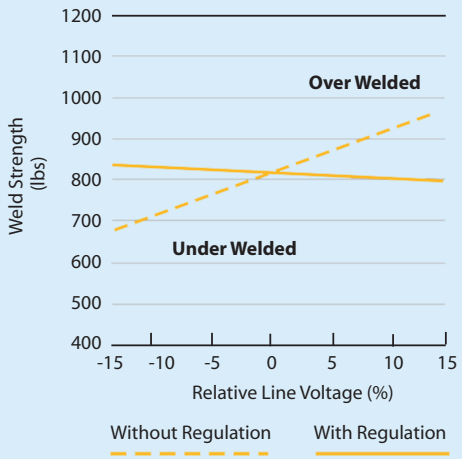


Fig. 1

- **Password Protection –** Feature for lock-out of unauthorized process changes once the equipment is set up for a specific application.
- **Built-in Cycle Counters –** Track production throughput and alarms.
- **Selectable Pre-triggering –** Auto, distance, and time.
- **System Protection Monitor (SPM) –** Five levels of power supply protection are provided: 1. Phasing, 2. Over voltage, 3. Over current, 4. Over temperature, 5. Power
- **Automation Interface –** Available for direct hookup with PLCs and PCs. Required automation I/Os are provided through a 24V DC logic interface.

Branson 2000X Standard Features (cont'd)

Communications

- **USB –** The addition of this port allows for a USB device to be linked to the unit, including mouse, memory sticks, etc.
- **X-Net –** An embedded VNC client that allows remote monitoring and networking through Ethernet communications.
- **External VGA Port –** Allows for the addition of either a remote monitor or touch screen to the system.
- **Choice of Language for Message Display –** English, French, German, Italian, Spanish, Japanese, Korean, traditional and simplified Chinese.

User Interface

- **Simple Navigation** through easy access touch keys.
- **Process Graphing with Graph Overlay Capability –** Graphing of power, collapse distance, amplitude, force, velocity, and frequency.
- **PMC - Power Match Curve –** A feature that allows the user to develop a standard power graph, then set limits for process monitoring.
- **Two Write-in Fields for Additional Setup Information.**
- **Horn Signature Graph** with comparison of up to three graphs.
- **Full VGA Touch Screen.**

Available Options

- SPC Software
- Touch Screen Monitor
- Base-mounted Leveling Plate for Horn/Fixture/Part Alignment
- Solid-mount Boosters
- Longer Columns – 4' to 6' Lengths
- Ground Detect Cable
- X-Port

2000X Series Standard Features Comparison

Standard Feature	2000X d	2000X ea	2000X t
Digital Power Supply			
Digital Autotune w/Memory	x	x	x
Total Amplitude Control	x	x	x
Programmable Starting Ramp	x	x	x
Energy Braking	x	x	x
Auto Seek	x	x	x
Line/Load Regulation	x	x	x
System Protection Monitor	x	x	x
User Interface & Communications			
Automation Interface	x	x	x
USB Port	x	x	x
X-Net	x	x	x
External VGA Port	x	x	x
Touch Screen Interface	x	x	x
Weld Results Display	x	x	x
Multiple Languages	x	x	x
Welder Process Control			
20, 30, 40 kHz	x	x	x
Amplitude Settings 10%-100%	x	x	x
External Amplitude Profiling	x	x	x
Number of Presets	16	12	2
Weld by Time	x	x	x
Weld by Energy & Power	x	x	
Weld by Distance (absolute & collapse)	x		
Weld by Ground Detect	x	x	x
Distance & Force Readings	x		
Amplitude Stepping	x	x	
Self-diagnostics/Monitoring	x	x	x
Built-in Cycle Counters	x	x	x
Selectable Pre-triggering	x	x	x

A Broad Choice of Actuators

Branson offers six actuator models that are compatible with our 2000X power supplies.

Standard features on all Branson actuators:

- **Variable Dynamic Triggering –** Provides consistent weld quality by triggering ultrasonic vibrations after a preset force. As melting of the plastic occurs, dynamic follow-through ensures the smooth, efficient transmission of ultrasonic energy into the part by maintaining horn/part contact and force.
- **Rigidity –** Further enhanced with three mounting points on the back plane of the actuator. Additionally, the optional fixed actuator support for column mounting is designed to solidly support the assembly.
- **Built-In, Adjustable Locking Mechanical Stop with Adjustable Knob –** When properly set, the stop prevents the horn from touching the fixture or nest when no work-piece is in place. The stop may also be used to control depth of weld or final part height. It is internal to the carriage with only the adjustment knob exposed, allowing 360° horn rotation without interference for alignment if required.
- **Ease of Setup and Changeover –** The converter/booster/horn stack is easily installed and removed from the front of the carriage assembly without repositioning the actuator. The stack may be rotated a full 360° in the carriage for horn alignment with the workpiece.
- **Settable Pressure and Down Speed.**
- **Cast Aluminum Carriage Door.**
- **Single-turn Flow Control –** Allows for accurate downspeed setting and easier resetting during application changeover.
- **Dynamic Triggering and Follow Through –** Provides consistent weld quality and smooth, efficient transmission of ultrasonic energy by maintaining horn part contact.
- **Enhanced Ergonomics –** Offers easy access to actuator controls with improved visibility.
- **1.5", 2.0", 2.5", and 3.0" Diameter Cylinders.**
- **Configuration Flexibilty –** May be operated vertically, horizontally, or inverted.

Models aed, aod, and aodl offer enhanced standard features

- **S-Beam Load Cell –** Provides precise trigger setting in pounds or Newtons, and displays all force data in weld graph.
- **Distance Encoder (aed, aod, and aodl) –** Allows for setting absolute and collapse distance with maximum precision, while displaying collapse distance and velocity in weld graphs.

Available Actuator Options

- **Ground Detection Kit –** Available for use with thin film or fabric applications.
- **Low Profile Door**

2000X Standard Actuator Features Comparison

	Actuator Model					
Standard Feature	2000X aed	2000X ae	2000X aod	2000X ao	2000X aodl	2000X aol
Variable Dynamic Triggering	x	x	x	x	x	x
Rigidity	x	x	x	x	x	x
Built-in Mechanical Stop	x	x	x	x	x	x
Easy Setup	x	x	x	x	x	x
Settable Pressure and Down Speed	x	x	x	x	x	x
Single-turn Flow Control	x	x	x	x	x	x
Dynamic Triggering Follow Through	x	x	x	x	x	x
Distance Encoder	x		x		x	
S-Beam Load Cell	x		x		x	
Remote Pneumatic Controls			x	x	x	x
Stroke Length (standard)	4"	4"	4"	4"	6"	6"

Actuator/Power Supply Compatibility

	Actuator Model					
Power Supply	2000X aed	2000X ae	2000X aod	2000X ao	2000X aodl	2000X aol
2000X d	x	x	x	x	x	x
2000X ea		x		x		x
2000X t		x		x		x

*Model 2000X **d** Ultrasonic Assembly System*

Maximum Precision, Control and Connectivity

Offering our most precise control, the Model 2000X d features a solid-state, electronic S-Beam load cell that allows you to set the trigger point for the actuator's applied force with maximum precision in pounds or Newtons. The load cell can also display all force data in the weld graphs.

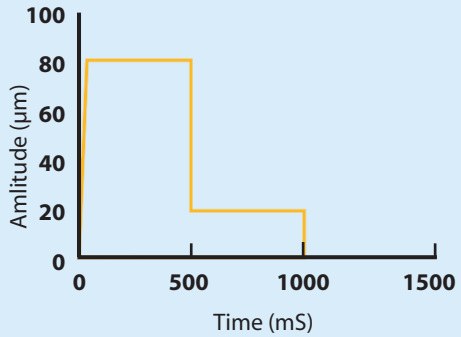
In addition, the 2000X d features an electronic encoder that measures the collapse distance of the part being welded and the absolute distance the actuator travels, allowing you to set the welder to weld by a specific collapse distance while displaying the collapse distance and velocity in the weld graphs.

- **Digital Power Supply.**
- **Full VGA Touch Screen Interface.**

Advanced Process Control

- **Multiple Weld Modes –** Weld by time, peak power, energy, distance (absolute and collapse), and ground detect.
- **Amplitude Stepping** for optimization of weld strength and appearance (Fig. 2).

Fig. 2



- **Built-in Cycle Counters** to track production.
- **Sixteen Nameable Presets** for ease of setup and changeover of applications.
- **Password Protection** feature for lock-out of unauthorized process changes once the equipment is setup for a specific application.
- **Total Cycle Time Can Be Displayed** in weld results screen.
- **Weld Results Screen** allows user to monitor key operating parameters.
- **VQS (Visual Quality Screen)** provides basic real-time quality monitoring.

Model 2000X d combines with actuator Models aed, ae, aod, ao, aol, and aodl

To determine what actuator model best suits your application, you can review the 2000X Actuator Features Comparison Chart on the previous page, and discuss your application with your Branson representative.

Model 2000X **ea** Ultrasonic Assembly System

Robust, Precision Performance for More Demanding Applications

The 2000X ea system offers enhanced performance and reliability needed to withstand the demands of applications requiring precise control, robust reliability and fast cycle times. The 2000X ea also offers all the control, communications, and user interface features that are standard to all 2000X assembly systems.

- **Digital Power Supply.**
- **Multiple Weld Modes –** Weld by time, peak power, energy, and ground detect.
- **12 Nameable Presets.**

Model 2000X ea combines with any one of three actuator models: ae, ao, and aol

To determine what actuator model best suits your application, you can review the 2000X Actuator Features Comparison Chart on an earlier page, and discuss your application with your Branson representative.

Model 2000X **t** Ultrasonic Assembly System

Reliable Performance for Less Demanding Applications

For applications that do not require highly advanced process controls, the 2000X t is the right choice. Featuring many of the same robust performance capabilities highlighted in our more technologically sophisticated models, this affordable workhorse promises years of reliable, precision performance.

- **Digital Power Supply.**
- **Multiple Weld Modes –** Weld by time and ground detect.
- **2 Nameable Presets.**

Model 2000X t combines actuator models: ae, ao, and aol

To determine what actuator model best suits your application, you can review the 2000X Actuator Features Comparison Chart on an earlier page, and discuss your application with your Branson representative.

Specifications for 2000X Actuators

Model	Cylinder size (")	Max. clamp force at 100 psig/690 kPa and 4" stroke*	Dynamic triggering range*	Dynamic follow-through range*	Stroke length
ae	1.5	130 lbs./578 N	5-159 lbf/22-707N	15-180 lbf/67-800N	4"/101.6 mm
	2.0	270 lbs./1.2kN	15-180 lbf/67-800N	15-180 lbf/67-800N	4"/101.6 mm
	2.5	440 lbs./1.96kN	15-180 lbf/67-800N	15-180 lbf/67-800N	4"/101.6 mm
	3.0	640 lbs./2.84kN	15-180 lbf/67-800N	15-180 lbf/67-800N	4"/101.6 mm
	3.25	770 lbs./3.42kN	15-180 lbf/67-800N	15-180 lbf/67-800N	4"/101.6 mm
aed	1.5	130 lbs./578 N	5-159 lbf/22-707N	5-159 lbf/22-707N	4"/101.6 mm
	2.0	270 lbs./1.2kN	5-282 lbf/22-1.25kN	5-282 lbf/22-1.25kN	4"/101.6 mm
	2.5	440 lbs./1.96kN	10-440 lbf/44-1.96kN	10-440 lbf/44-1.96kN	4"/101.6 mm
	3.0	640 lbs./2.84kN	10-636 lbf/44-2.83kN	10-500 lbf/44-2.22kN	4"/101.6 mm
	3.25	770 lbs./3.42kN	10-725 lbf/44-3.22kN	10-500 lbf/44-2.22kN	4"/101.6 mm
ao	1.5	130 lbs./578 N	5-159 lbf/22-707N	15-180 lbf/67-800N	4"/101.6 mm
	2.0	270 lbs./1.2kN	5-180 lbf/22-800N	15-180 lbf/67-800N	4"/101.6 mm
	2.5	440 lbs./1.96kN	15-180 lbf/67-800N	15-180 lbf/67-800N	4"/101.6 mm
	3.0	640 lbs./2.84kN	15-180 lbf/67-800N	15-180 lbf/67-800N	4"/101.6 mm
	3.25	770 lbs./3.42kN	15-180 lbf/67-800N	15-180 lbf/67-800N	4"/101.6 mm
aod	1.5	130 lbs./578 N	5-159 lbf/22-707N	15-159lbf/67-707N	4"/101.6 mm
	2.0	270 lbs./1.2kN	5-282 lbf/22-1.25kN	5-282 lbf/22-1.25kN	4"/101.6 mm
	2.5	440 lbs./1.96kN	10-440 lbf/44-1.96kN	10-440 lbf/44-1.96kN	4"/101.6 mm
	3.0	640 lbs./2.84kN	10-636 lbf/44-2.83kN	10-500 lbf/44-2.22kN	4"/101.6 mm
aol	2.5	440 lbs./1.96kN	15-180 lbf/67-800N	15-180 lbf/67-800N	6"/152.4 mm
	3.0	640 lbs./2.84kN	15-180 lbf/67-800N	15-180 lbf/67-800N	6"/152.4 mm
aodl	2.5	440 lbs./1.96kN	10-440 lbf/44-1.96kN	10-440 lbf/44-1.96kN	6"/152.4 mm
	3.0	640 lbs./2.84kN	10-636 lbf/44-2.83kN	10-500 lbf/44-2.22kN	6"/152.4 mm
Pneumatic Requirement: Clean (5 micron, filtered), dry, non-lubricated air between 35 and 100 psi (130 – 690 kPa)					

*In pounds (lbs.) and Newtons (N)

Specifications for 2000X Power Supplies

2000X Power Supply Models d, ea, and t share the following specifications.

Power Supply	20:1.25	20:1.2.5	20:4.0	30:0.75	30:1.5	40:0.4	40:0.8
Output Power:	1250 Watts	2500 Watts	4000 Watts	750 Watts	1500 Watts	400 Watts	800 Watts
Line Voltage:	100-120 V AC* 50/60 Hz 1Ø	200-240 V AC 50/60 Hz 1Ø	200-240 V AC 50/60 Hz 1Ø	100-120 V AC* 50/60 Hz 1Ø	100-120 V AC* 50/60 Hz 1Ø	100-120 V AC* 50/60 Hz 1Ø	100-120 V AC* 50/60 Hz 1Ø
Max. Current:	14 amps max.	14 amps max.	25 amps max.	10 amps max.	26 amps max.	5 amps max.	10 amps max.
Receptacle Required	NEMA 5-15R	NEMA L6-20R	NEMA L6-20R	NEMA L6-20, 5-15R	NEMA L6-20, 5-20R	NEMA L6-20, 5-15R	NEMA L6-20, 5-15R
Frequency:	20 kHz	20 kHz	20 kHz	30 kHz	30 kHz	40 kHz	40 kHz
Max. Cycle Rate:	80 cpm (application dependent)						
Ambient Temp. Range:	41-122˚ F (5-50˚ C)						

* 200-240 V AC optional.

Branson is the Recognized Leader in Ultrasonics Worldwide

For more than 60 years, Branson has been a leader in the development of advanced ultrasonic plastics welding technologies. Our reputation for innovation, manufacturing excellence, and reliable performance is unsurpassed. And our global network of distributors ensures you will have the equipment options, accessories, supplies, and support you need to meet the most demanding or unique application.

BRANSON

The Branson Advantage

Branson is committed to not only engineering and supplying ultrasonic plastics welding systems to meet your needs, but also to providing applications support, employee training, troubleshooting, and ongoing customer service so that your equipment continually operates as expected.

To learn more about the 2000X Series Ultrasonic Assembly Systems, contact your BRANSON representative or call the BRANSON office in your area.

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All specifications are subject to change without notice. All dimensions are nominal.
All units comply with FCC rules and regulations governing radio frequency interference. CE units are available.
Note: All sales shall be subject to the Supplier's terms and conditions of sale in Branson's quotations and sales contracts.

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